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The fact that the exact age of each horizon referred to is clearly established in the geological column should make these beds of particular interest to the paleobotanist and should contribute materially to our facilities in correlating the much-discussed Interior Tertiaries. DANIEL W. LANGDON, JR., F.G.S.A.
Cincinnati, Ohio.

Bowser's Mathematical Text-Books.

I HAVE just read a note on "Bowser's Trigonometry" by Professor Hodgkins in *Science* of Jan. 20. Permit me to add a few words on Bowser's series, both in the way of praise and criticism, and, therefore, favoring both sides of the question. I used his analytical geometry and calculus for two years with good results. They are well adapted to the average student in arrangement, examples, and general plan, and they are more modern than most text-books of the same class. But the subject is sometimes unnecessarily complicated, as in solid analytics, where the beauty of the method of direction-cosines is seriously marred. Also, in respect to the details of accuracy of statement and logical demonstration, I am sorry to class the series among the free and easy kind of which we have so many, although among the best of that kind. The public is as much at fault for accepting and even demanding books in that style as are the authors for writing them.

Let me illustrate by his treatment and use of the method of infinitesimals. That method is at best a dangerous one, even in the hands of the masters, let alone the average student. This is sufficiently well illustrated by the errors into which Professor Bowser himself has fallen; and he should read the scoring that Clausius gave his mathematical critics on their use of infinitesimals. He will find that he is in good company. Most anything can be proved to the satisfaction of the average student, just as Professor Bowser establishes the differentials of the trigonometric functions. Thus, by trigonometry,

$$\begin{aligned} \sin(x+dx) + \cos(x+dx) &= \sin x \sqrt{2} \cos\left(\frac{\pi}{4} + dx\right) \\ &+ \cos x \cos dx + \cos x \sin dx \\ &= \sin x + \cos x + \cos x dx, \end{aligned}$$

since $\sqrt{2} \cos\left(\frac{\pi}{4} + dx\right) = 1$, $\cos dx = 1$, $\sin dx = dx$.

Hence $d(\sin x + \cos x) = \cos x dx$, a false result.

Professor Bowser is more fortunate than the critics of Clausius, since he happens upon a final result that is correct; but, farther along, this good luck deserts him, in the case of a carefully-worked example (Calc., ex. 3, p. 325). Another case is ex. 8, p. 338. In view of these facts, I hope Professor Bowser will revise his demonstrations and eulogy on infinitesimals, to the decided improvement of his valuable book. A. S. HATHAWAY,

Professor of Mathematics, Rose Polytechnic Institute.

Terre Haute, Ind., Jan. 28.

Some Additional Remarks on Maya Hieroglyphic Writing.

IN a former communication, replying to some objection brought forward by Professor Thomas, I noticed that in the numerals, composed of straight lines and dots, which are seen accompanying the hieroglyphs of the Maya inscriptions, the one dot of the numbers 1, 6, 11, 16 always is supported and framed by two ornamental signs filling up the space, while no ornamental sign is seen between the two dots of the numbers 2, 7, 12, 17. I noticed this for a Copan Stela published by Alfred Maudsley (see the Figs. 1-16 in my former paper). I may add that the same applies to the inscriptions of the Palenque tablets, only that here the two dots of the number 2, like the one dot of the number 1, are framed by two ornamental signs, while the two dots of the numbers 7, 12, and 17, as a rule, are standing alone. I wish to state that although prevailing in most cases, this rule may allow some exceptions. Alfred Maudsley, page 39 of the text, gives drawings of the numerals, where an ornamental sign, similar to the two ornamental signs of the numbers 1 and 6, is seen between the two dots of the numbers 2 and 7. Maudsley does not mention where he has taken these figures. But, for instance, on the cross-tablet 1, of Palenque, in the hieroglyph V. 17, designating

the twelfth day of the month Kayab, a somewhat peculiar ornamental sign, composed of two nooks, is seen between the two dots of the number.

In connection with these facts, I wish to mention that there really exists an instance of a cross between the two dots of a number in Dresden Codex 46, already mentioned by Professor Förstemann in *Zeitschrift für Ethnologie*, 23 (1891), p. 149, that, unfortunately, I had overlooked. DR. SELER.

Steglitz, Germany, Jan., 1893.

Languages of the Gran Chaco.

I WAS very much gratified to see that Dr. Brinton thinks well of my intention to publish all the material I can get hold of connected with the languages of the Gran Chaco. The following facts may be of interest to him and other Americanists on your side of our continent.

1. Dr. Brinton is quite right in giving the name of "Guaycurú" to the Abipone and other cognate dialects. The root word is *ary*, which simply means "a fierce savage." *Gu* and *curú* are simply particles.

2. The linguistic library of the La Plata Museum will comprise two series: First, the Guaycurú; second, the non-Guaycurú group.

The Guaycuru Group

a. MOCOBI. Father Tavolini's MS. faithfully reproduced; a grammar founded on same, with a preliminary discourse and other papers. An English version of the grammar.

b. TOBA. Father Barcena's MS. complete, with supplementary vocabularies by Carranza, Pelleschi, the editor, and others. A preliminary discourse on the language. An English translation of F. Barcenas Quires.

c. ABIPON. Father Dobrizhoffer's chapters on this dialect, supplemented from MSS. supposed to be Father Brigniel's, with a preliminary discourse, and most important vocabulary.

d. LENGUA. Cerviño's MS. vocabulary. Evidently a cognate dialect, with Mansfield's Payaguá. Preliminary discourse on the same subject.

e. GUAYCURÚ. An essay on Castelnan and Gibú's vocabularies.

Non-Guaycuru Group.

a. A reproduction of Father Machoni's work on the Lule language, with an essay on the suffixing dialects of the Chaco.

b. An essay on the Vilela and Chulupí dialects, to accompany Pelleschi's vocabulary.

c. MATACO. Pelleschi's grammar and vocabularies, with notes and preliminary discourse by the editor.

d. Possible numbers in Mataguays, Nocten (Mataco dialects), and Chiriguano (a Guaraní dialect).

Dr. Moreno, director of the La Plata Museum, is doing his best to push this work forward. SAMUEL A. LUFONE QUEVEDO.

Pilelao, Catamarca, Argentine Republic, Dec. 18.

Controversies in Science.

IT might be well for scientific controversialists to bear in mind that undue heat is an indication — as in mechanics — of want of that balance that should constitute a judicial mind. The world generally views with amusement the frothy utterances of the man on the wrong side who finds himself hard pressed by reiterated facts, and judges him to be in the wrong, frequently, by his language, when he may be correct entirely. One without any knowledge of the facts of the present controversy between a few persons connected with the U. S. Geol. Survey — a survey at present under a cloud from the disbelief of Congress as to its needs and usefulness — and the upholders of "palæolithic man," would naturally incline to the side taken by Professor Wright, merely from the perfect courtesy and evenness of temper which he has preserved under exceptional circumstances. It is seldom in the course of controversy that a clergyman of good character has been so bespattered with epithets, innuendoes, and charges that would render him — if true — worthy of abrupt expulsion from any position of trust, or from any decent religious body.